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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/434,913	11/05/1999	GEORGE STEPHEN MECHERLE	247/185	4535

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EXAMINER

BELLO, AGUSTIN

ART UNIT	PAPER NUMBER
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2633

DATE MAILED: 02/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/434,913

Applicant(s)

MECHERLE ET AL. 

Examiner

Agustin Bello

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-12, 21, 22, 26-30 and 32-34 is/are rejected.
- 7) ☒ Claim(s) 5, 13-20, 23-25, 31 and 35-40 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 7-9, 27-29, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilmoth (U.S. Patent No. 5,416,627).

Regarding Claims 1, 2, 27, and 28, Wilmoth teaches a portable transceiver of one or more signals, comprising an input for receiving the one or more signals (e.g. input to frequency modulator 26 in Figure 1); a frequency modulator coupled with the input and modulating the one or more signals (reference numeral 26 in Figure 1), and a plurality of collimated lasers (column 7 lines 52-59) coupled with the splitter to receive the laser data signals, the lasers being displaced from one another and facing in parallel directions (see Figure 5). Wilmoth differs from the claimed invention in that Wilmoth fails to specifically teach a splitter coupled with the frequency modulator to divide the modulated signal into laser data signals. However, Wilmoth teaches that a driver (reference numeral 30 in Figure 1) at least four channels wide is used to drive the laser array (column 8 lines 40-44), thereby suggesting that the modulated signal is split via a splitter of some type into four modulated data signals that drive individual lasers of the laser array. One skilled in the art would clearly have recognized that it would have been beneficial to divide the modulated signal into a plurality of modulated data signals via a splitter in order to provide redundancy in the event of a laser failure (e.g. burnout of one of the lasers). Wilmoth further

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differs from the claimed invention in that Wilmoth fails to specifically teach that lasers are used as the light emitting elements. However, Wilmoth does disclose that it is well known in the art to use lasers in an array in a wireless environment (column 1 lines 64-67). Furthermore, one skilled in the art would have appreciated that the use of lasers would have provided an improvement over the use of LEDs as taught by Wilmoth in that lasers are less susceptible to diffusion and provide a greater range for communication. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have split the modulated signal via a splitter of some type into modulated data signals that drive individual light emitters of an array, as suggested by Wilmoth. Furthermore, it would have been obvious to one skilled in the art at the time the invention was made to have used lasers as the light emitting elements in the array in order to provide a greater range for communication while making the light signal less susceptible to diffusion.

Regarding Claims 3 and 29, Wilmoth teaches that the plurality of lasers further includes lenses receiving the laser outputs (column 7 lines 52-56). Wilmoth differs from the claimed invention in that Wilmoth fails to specifically teach collimating the outputs into beams of less than 1° cone angle each. However, one skilled in the art would clearly have recognized that it would have been possible to collimate the outputs into beams to any desired cone angle via the selection of lens with desired properties. Collimation of laser light to a specific cone angle via a lens is well known in the art and would have been both obvious and well within the realm of knowledge of one skilled in the art at the time the invention was made.

Regarding Claim 7, Wilmoth differs from the claimed invention in that Wilmoth fails to specifically teach a laser driver generating a continuous sine wave to each laser with a 20

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megahertz bandwidth. However, such limitations are within the scope of the invention of Wilmoth being that Wilmoth teaches that the system is for use in a high data rate system. The disclosure of Wilmoth would have suggested that any of a variety of high bandwidth drivers could have been used to achieve the high data rate of the system including a driver which provides a continuous sine wave to each laser with a 20 megahertz bandwidth. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have used a 20 megahertz bandwidth laser driver in the system of Wilmoth in order to achieve the high data rate disclosed by Wilmoth.

Regarding Claim 8, Wilmoth differs from the claimed invention in that Wilmoth fails to specifically teach that each laser diode generates an average power of 80 milliwatts. However, through practice and experimentation, one skilled in the art would clearly have been able to adjust the system of Wilmoth in order to achieve a desired output power of the laser diodes. It would have been obvious to one skilled in the art at the time the invention was made to have adjusted the system of Wilmoth so that each laser diode generated an average power of 80 milliwatts.

Regarding Claims 9 and 33, Wilmoth teaches there being four diodes (see Figure 5). Wilmoth differs from the claimed invention in that Wilmoth fails to specifically teach that lasers are used as the light emitting elements. However, Wilmoth does disclose that it is well known in the art to use lasers in an array in a wireless environment (column 1 lines 64-67). Furthermore, one skilled in the art would have appreciated that the use of lasers would have provided an improvement over the use of LEDs as taught by Wilmoth in that lasers are less susceptible to diffusion and provide a greater range for communication. Therefore, it would have been obvious

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to one skilled in the art at the time the invention was made to have used laser diodes in the system of Wilmoth in order to provide a greater range for communication while making the light signal less susceptible to diffusion.

3. Claims 4, 6, 30, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilmoth in view of Okayasu (U.S. Patent No. 6,381,054).

Regarding Claims 4, 6, 30, and 32, Wilmoth differs from the claimed invention in that Wilmoth fails to specifically teach that the laser driver includes a modulation signal amplifier coupled with the splitter and a DC bias circuit coupled between the modulation signal amplifier and one of the laser diodes. However, one skilled in the art would clearly have recognized that when a signal is split into a plurality of signals, the signal power of the split signal will only be a fraction of that of the original signal. One skilled in the art would have recognized that an amplifier would have been beneficial in achieving the same signal power in the split signal as in the original signal, thereby ensuring proper transmission of the signal. One skilled in the art would also have recognized that it is necessary to have a DC bias current to drive a laser. Furthermore, Okayasu teaches that it is necessary to have a DC bias current to drive a laser (column 4 lines 1-4). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have amplified the split signal via an amplifier coupled with the splitter in order to achieve the same signal power in the split signal as in the original signal, thereby ensure proper transmission of the signal, and further to have included a DC bias circuit coupled between the modulation signal amplifier and one of the laser diodes in order to drive the laser.

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4. Claims 10-12, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilmoth in view of Laughlin (U.S. Patent No. 4,054,794).

Regarding Claims 10 and 34, Wilmoth differs from the claimed invention in that Wilmoth fails to specifically teach a visual sighting scope aligned with the lasers. However, one skilled in the art would clearly have recognized that in free-space optical communication, proper alignment between transmitter and receiver is essential. In order to ensure proper alignment between the transmitter and receiver of a free-space optical communication system, it is well known to use a sighting scope to aligned with the light emitters. Wilmoth teaches this line of sight method in the disclosure of the invention (column 2 lines 49-53). Furthermore, Laughlin, in the same field of endeavor, also teaches that it is well known in the art to use a visual sighting scope aligned with the lasers in order to ensure proper alignment between transmitter and receiver in free-space optical communication system (reference numeral 36 in Figure 6). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have used a visual sighting scope aligned with the lasers in a free-space optical communication system in order to ensure proper alignment between transmitter and receiver.

Regarding Claims 11 and 12, Wilmoth teaches a frequency modulator, but fails to specifically teach coupling video or audio subcarrier generators to the frequency modulator. However, the system of Wilmoth is clearly capable of transmitting a variety of different types of signals including video and audio (e.g. digital computer data column 1 lines 15-19). Furthermore, Laughlin teaches that it is well known in the art to transmit video and audio information by modulation of the output of a light source such as a laser (column 1 lines 11-14). Therefore, it would have been obvious to one skilled in the art at the time the invention was

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made to have coupled video or audio subcarrier generators to the frequency modulator of Wilmoth in order to transmit video and audio information as is well known in the art.

5. Claims 21 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mearns (U.S. Patent No. 5,969,860).

Regarding Claims 21 and 26, Mearns teaches an optical system comprising an aperture (reference numeral H in Figure 1); a Mangin mirror in line with the aperture (reference numeral E in Figure 1); a detector system at the focal point of the Mangin mirror (reference numeral G in Figure 1); Mearns differs from the claimed invention in that Mearns fails to specifically teach a transceiver and a photodiode at the focal point of the Mangin mirror or an output from the photodiode. However, it is clear that since the system of Mearns is a receiver of optical signals, the detector G of the system inherently comprises a photodetector for the detection of the optical signals from which electrical signals are output. Furthermore, it is well known in the art to detect optical signals via a photodiode, then output an electrical equivalent of the detected optical signal. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have included a photodiode within the detector assembly G of Mearns with an output to output an electrical equivalent of the detected optical signal.

In regard to the recitation of a "portable transceiver" in the preamble, this recitation has not been given any weight since the body of the claim does not depend on the preamble for completeness. In re Hirao 532 F.2d 67 190 USPQ 15 (CCPA 1976) and Kopra v., Robie 187 F.2d 150, 152, USPQ 478, 481 (CCPA 1951).

Absent any teaching of criticality, it would have been a matter of design choice or given the general environment of the prior art it would have been obvious to obtain an optimal value by

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routine experimentation. Therefore, an f-number of about 0.67 would have been attainable for one skilled in the art.

6. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mearns in view of Laughlin.

Regarding Claim 22, Mearns differs from the claimed invention in that Mearns fails to specifically teach a preamplifier coupled with the photodiode; an automatic gain control coupled with the preamplifier and with the output. However, one skilled in the art would clearly have recognized that since the optical have traveled through free-space they are susceptible to interference and have thereby been reduced in power. One skilled in the art would have recognized that a method to remedy this is through amplification of the received via an automatic gain controlled pre-amplifier. Laughlin, in the same field of endeavor, teaches that it is well known in the art to pre-amplify a received signal via an automatic gain controlled pre-amplifier to counteract the effects of free-space optical transmission on an optical signal (column 4 lines 9-12).

Allowable Subject Matter

7. Claims 5, 13-20, 23-25, 31 and 35-40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

8. Applicant's arguments filed 11/20/02 have been fully considered but they are not persuasive. The applicant argues that Wilmoth fails to specifically teach a plurality of collimated lasers. However, the examiner disagrees. Wilmoth clearly teaches that the front

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portion of the annular member that houses the light emitters may optionally be provided in the manner of a lens constructed of suitable transparent materials which allows one to focus (e.g. collimate) the light sources at an optimum distance (column 7 lines 52-59).

The applicant further argues that the disclosure of Mearns teaches a Mangin mirror that is planar and inherently does not include a focal point. However, Mearns clearly teaches that the Mangin mirror (reference numeral E in Figure 1) directs light to the focal plane (reference numeral 12 in Figure 1) of the detector system in a housing (reference numeral G in Figure 1). Clearly, the Mangin mirror of Mearns has a focal plane, and therefore a focal point since a plane is defined by at least two points.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Krause, Li, Nagai, Hatton, and Popescu all teach elements of the claimed invention.

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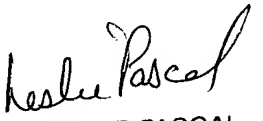
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (703)308-1393. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703)305-4729. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9314 for regular communications and (703)872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

AB

January 27, 2003


LESLIE PASCAL
PRIMARY EXAMINER